

NM Legislative Interim Committee on Water and Natural Resources
RIO GRANDE RESTORATION REPORT: River Flow Protection
November 7, 2011

Thank you, Mr. Chairman. My name is Steve Harris and I am the owner of Far-Flung Adventures, a river outfitting enterprise, based in Taos, as well as the Executive Director of Rio Grande Restoration, river conservation NGO, with a region-wide focus. I want to thank the committee and its staff (Kim Bannerman, Jon Boller) for the opportunity to talk with you today about progress in addressing New Mexico's continuing challenge with protecting the functioning condition of our rivers. This is a goal that depends, in large measure, on securing the appropriate flow of water in them.

New Mexico's continuing policy of developing water supplies, and the absence of a policy direction to manage the health and integrity of rivers, suggests that the state is not yet in a position to adequately protect our rivers. The next few years will likely tell the tale on whether we can achieve the appropriate balance of river protection with water development. Failing to directly tackle this issue will inevitably subject our rivers to reduced flows. (And this policy vacuum would almost certainly be filled by federal initiatives.)

I'd also note that the constituency for "river-friendly" policies is sizeable and non-partisan. Anglers and whitewater recreationists are numerous and highly motivated to protect river resources. They also represent a growth sector in the state's tourism economy. All citizens have a stake in the high costs of flood hazard mitigation, endangered species compliance, human health and environmental sustainability, and other issues inherently linked to the health of rivers.

There are signs that administrative and policy decisionmakers in our state are becoming more aware of the importance of undertaking river improvement projects, including those which address the problem of inadequate flows. We still have a way to go in fully integrating the flow problem into our struggle with the many dimensions of providing present and future water supplies.

My task today is to update the Committee on:

- The outcomes of the HJM 3 study, which sought to identify "streams at risk of degradation due to hydrologic alteration".
- The progress of an environmental flow demonstration project currently underway on the Rio Chama.
- Time permitting, I hope we can also consider other steps the Legislature might take as you continue to address this issue.

Most members of this committee who served in the 2009 legislative session had a chance to, and did, vote for HJM 3.¹ You'll recall that this memorial declared "that the policy of the state... [is] to use scientifically derived information appropriate to each stream system

¹ The memorial unanimously passed in the House and cleared the Senate Rules and Conservation Committees without opposition, but died on the Senate calendar on the final day of the 2009 session.

in managing stream flows...to protect rivers... riparian areas... agricultural lands and compliance with legal mandates...” The State Engineer, Interstate Stream Commission and Departments of Environment, Energy and Minerals, Game and Fish and Agriculture were to cooperate in the study, supply data and technical expertise. Members of these agencies were joined by conservation and agricultural group representatives and other publicly and privately employed scientists the “Environmental Flows Technical Team”. This Team met several times to evaluate the task, available resources and wrote the scope of work for the NM Hydrologically Altered Rivers study, which has just been released (October 26, 2011). Cadmus Group was awarded the contract and prepared the report, under a grant from EPA’s Healthy Watersheds Initiative. (Twelve copies available)

The original vision for this study was that historical data, from relevant stream flow gauges in the state’s five river basins, would be compared with more recent data to measure the long term changes in discharge, the magnitude, timing, duration and frequency of river flow events, that have occurred over the period of record. The resulting Index of Hydrologic Alteration (IHA) is a model, developed by the Nature Conservancy, which has been used to inform a number of environmental flow projects in the United States and abroad.

At the same time, the New Mexico study would evaluate the status on a number of resource issues, such as aquatic and riparian habitat conditions, changes in aquifer levels, sediment and river geomorphology, forest and agro-ecosystem health. In all, eight parameters were identified by the state Technical Team. The hope was that by mapping areas which have significant issues with water supply and ecological condition and overlaying these with demonstrated changes in stream flow, the state could identify the rivers most in need of management attention and those that, with relatively little investment, could be protected. We hoped to be able to offer the Legislature a picture of where we might best put our limited resources to work improving the conservation status of rivers.

State Study: Your handout contains some pages relating to the new report, the *Evaluation of Hydrologic Alteration and Opportunities for Environmental Flow Management in New Mexico*- the “State Study”. I want to state at the outset, that the real, substantive output of the report is technical. Since I slept through statistics in college, I am not the guy to talk about the technical methodology used in the Index of Hydrologic Alteration. I did bring a few copies of the entire 60+-page report, if any of you are interested in obtaining a copy. I just want to take a few minutes to touch on some information a layman, or non-technical policymaker, can glean from among the data.

1. The Study was not able develop the flow-ecology relationships which the State Technical Team had hoped to address. The Technical Team’s ecological factors are listed at the bottom of page one of your handout. In most cases the relevant data had not been collected, was incomplete or not in a usable form. This leaves the State Technical Team (whose membership is listed on the top of page one) with quite a bit more work to do, if we hope to come up with a picture of areas that have serious issues that an environmental flow program can hope to address. If you look at the full report, the

authors did present data on each of these ecological measures, but for the most part, these were not suggestive of the impacts that we hypothesize flow alteration may be having.

The locations of the gauges that were analyzed are shown on the map on page 3 of the handout. As expected, there were significant flow alterations on 28 of the 32 sites analyzed. Some of these showed trends toward lowered peak flows, which may point to problems with sediment clogging channels, which might dispose these segments to more frequent floods or it might point to areas where the river and the floodplain are more disconnected from each other than in the past, predisposing these segments to non-native species invasions and loss of primary productivity for habitat and farming.

Some segments showed lower or shorter duration base flows, which might affect the survival of aquatic species, which may be implicated in some of our endangered species problems. And some showed both.

I think the take home message is that we need to develop robust flow-ecology relationships on individual streams, where practical opportunities to improve flows (and flow dependent ecologies) exist.

The map on the back of page two is one example of the Study's attempts to graphically portray problems on the landscape. It plots the **ratio of water use to water availability**, which is significant because there is a hypothetical threshold of water utilization, above which rivers cease to perform their basic functions of channel maintenance, sediment transport, dilution and transport of pollutants and habitat for ecological indicator species.

The light beige areas are watersheds in which more than half the available water is utilized. You can see that this is the case in most of the state. The darkest (blue) watersheds represent river segments where 10% or less of the available water is consumptively used. What I find significant here is that these low depletion segments may represent the "low-hanging fruit" for flow protection.

2. The Study does suggest some priority stream reaches. The good news is that the Index of Hydrologic Alteration analyses have now been done for river and stream segments where there is long-term gauge data and we should be able to build on them.

Directing your attention to the table on the front of page 3, you'll find the ecological and hydrologic vulnerability scores, which are rough measures of streams showing the most highly altered hydrology or ecology. The State Technical Team will meet this winter to discuss these results, but my own initial impressions are that the streams listed under the "Additional Analysis Needed" tab may suggest some priorities for us to develop of flow-ecology relationships, moving forward.

3. The Study included a case study on the San Juan River, where high flow management at Navajo Reservoir is currently being tested for benefits to endangered fish. (This is on the back of the table). The San Juan Basin Recovery Implementation Program is addressing the problem of the progressive simplification of

river channels since Navajo closed its gates in 1962, by using high flows releases during spring runoff to try to restore backwater habitats for breeding pike minnows and chubs.

The graph of annual hydrographs allows comparison of Pre-dam stream flow, post-dam stream flow and the more Recovery Implementation Programs more recently restored flow regime. The spikes show the magnitude of spring high flows, and we can clearly see the difference between dam operations for storage alone and today's operations, which accommodate both storage and habitat formation objectives. The depiction of both high and low flow alterations is noteworthy, even dramatic.

A couple of other things to note about the San Juan project is that it is monitoring the success of flows in restoring habitat, to allow adaptive management of the flow regime over time and it is being implemented in collaboration with New Mexico's water users and those downstream.

Chama Flow Project: The State Study also called out several other examples of environmental flow programs being implemented in New Mexico, including the Strategic Water Reserve's Vaughn Pipeline, which ISC uses to ensure Pecos River Compact Compliance and its lease acquisition of City of Belen water rights in the Middle Rio Grande. Another project cited was Rio Grande Restoration's Rio Chama Flow Optimization Project, which is intended to initiate positive changes in the management of El Vado Reservoir.

Funded by a state (NMED) River Ecosystem Restoration grant, The Rio Chama Flow Project illustrates several important things to consider when thinking about a river flow protection policy for New Mexico:

1. **There are real-life economic issues at stake.** Present reservoir management is devoted to delivering water for irrigators in the MRGCD service area and ensuring New Mexico's Rio Grande Compact deliveries. The resulting alterations in Rio Chama hydrology have resulted in several unintended consequences:
 - a. seasonal water shortages to Rio Chama Acequia Association **irrigators**, who depend upon run-of-river diversions that are often unavailable in the late season;
 - b. lost **hydro-power** generating capacity; during peak demand periods, flow releases cannot be adjusted to generate adequate peaking power, compelling Los Alamos County Utilities (which has generators at both El Vado and Abiquiu) to purchase (expensive) power from the coal-fired sources;
 - c. mortality to benthic organisms which form the food base for economically important **Brown Trout**; this is due to untimely reductions in flow which expose breeding areas at the channel margins;
 - d. lost economic opportunities to tourism industry, due to the unreliability of minimum flows during the **whitewater rafting** season. More holistic flow management has the potential to address these issues.
2. **We can use analytical methods for determining how much water the river needs.** The Chama Flow Project's Science Team is collecting baseline data on the composition of riparian vegetation communities, the sediment regime and

channel morphology and aquatic habitat for fish and benthic macro-organisms (the food base for fish). When these tasks are complete, the team will establish a framework of ecological linkages between these factors and the annual flow regime of the river, arriving at flow targets that might help realize the ecological potential of this river system.

Without pre-judging the process, flow management on the Chama is likely to include provisions for: a. **Flood flows** of sufficient magnitude to move sediment and shape structural habitat in the river channel and floodplain, with attention to the natural timing of such events (such flows need not occur annually); b. **Subsistence flows** that will support the life cycles of aquatic and riparian species; c. Lower **Rates of change** that will further support ecological processes.

An Optimization Model will be employed to statistically reconcile these e-flow recommendations with water delivery rules, hydro-power generation and recreational needs.

The last page of your handout is an excerpt from the Project's latest newsletter which lists the entities invited to participate and the Project's Core Team.
<Jon Boller can get you on mailing list>

3. Improved Water Management can obviate the need to acquire water rights. The Rio Chama is unique, in that it actually receives a subsidy of water in the form of San Juan-Chama Project deliveries. A 40% increase in the average flow discharge and the presence of El Vado just above and Abiquiu Reservoir just below and the absence of irrigation diversions in the project reach gives us a lot of flexibility in implementing an environmental flow regime. Physically, the reservoirs can be operated differently, leaving us to work through the political and legal regimes that govern the river. <handout page x> This will be accomplished through a Project Advisory Council tasked with endorsing (or modifying) the e-flow recommendations.

On other rivers, such as the San Juan, water that must be released or passed-through to satisfy the entitlements of downstream users can be managed to meet flow targets. However, there are some situations, like the Pecos and Middle Rio Grande where appropriations are so extensive that water must be acquired to satisfy even the most minimal of ecological conservation goals. Even here, though, there are techniques of conservation and efficiency that managers can put into play, provided the water saved can be applied to the conservation purpose, a not-inconsiderable challenge that the Strategic Water Reserve was designed to address.

Legislative options: At the outset, I suggested that now is the time to retrofit our water policy structure, if we are to assure that coming generations of New Mexicans can continue to enjoy the benefits we get from flowing waters. Each river is a special case and real progress toward restoring them depends most of all on more creative, local

projects. To leverage more successes, local people need our legislative leaders to provide additional tools. Much of what we've begun in New Mexico has been with private and federal resources, a trend I'd expect to continue. One of the nice things about river work, from my perspective, is that it is really not a partisan issue.

As with other important issues, what the Legislature does is important, but not as important as simply continuing to confront the need for change. I'll offer three things that you might be able to accomplish in this session or the next:

1. **Invest in river science.** I think the agencies involved in the State Technical Team could complete the tasks laid out in HJM 3 and begin to prioritize the most promising rivers to work on. Especially useful to water managers would be expanding our understanding of the relationship of aquifers and rivers, the trends and their drivers in riparian forest conditions, sedimentation and salinity, statewide. This could be accomplished with appropriations to the Technical team or, in the alternative, additional funding to entities like the Bureau of Geology, UNM Natural Heritage Institute, Department of Agriculture and State Engineer, to data collect and analyze important data that were missing from the Cadmus Report.

2. **Authorize a successor program to the River Ecosystem Restoration Initiative.** Many positive river projects have been implemented with state funding in the past four years and a number of federal cost share programs still exist that we might leverage. We have heard that the Martinez Administration may be considering proposing such a program. It may, but need not, be a capital or severance tax bond expenditure, and would be most vital as a recurring general fund item. Several agencies are positioned to offer it a home.

3. **Resolve the issue of Beneficial Use.** Improbable as it seems, in a state that has two of the Western US' largest stream flow programs (on the Pecos and Middle Rio Grande), one occasionally, still hears the assertion that "instream flow is not a beneficial use of water." Passage of a measure such as Representative Gentry and others sponsored in the last session could clarify this point or at least allow you to make a policy statement in favor of rivers.

Thank you for this opportunity to speak with you. I hope I've been able to convey the passion and urgency so many of us feel for our the work of sustaining our rivers (Rio Grande, San Juan, Pecos, Gila, Canadian, the Chama, Mimbres, Santa Fe, the Red...and all the rest) and the hope that, with your help, the state recognize and take advantage of opportunities to make progress on the stream flow issue.

I'll be glad to stand for questions.

